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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/787,021	04/18/2001	Naoyuki Kobayashi	HST10112PUSA	8135

35312 7590 10/31/2003

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EXAMINER	
LEADER, WILLIAM T	

ART UNIT	PAPER NUMBER
1742	

18KB

DATE MAILED: 10/31/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

18 ICB

Office Action Summary	Application No.	Applicant(s)	
	09/787,021	KOBAYASHI ET AL.	
	Examiner	Art Unit	
	William T. Leader	1742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 August 2003* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,5-8 and 11-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1, 5-8 and 11-25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

1. Receipt of the amendment filed on august 11, 2003, is acknowledged. Claim 25 has been added. Claims 1, 5-8 and 11-25 are pending.

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 112

3. Claims 1, 5-8 and 11-24 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. As indicated in the previous office action, independent claims 1 and 22 were amended to recite treating a metal substrate "that is devoid of titanium and titanium alloys". This added negative limitation is considered to constitute new matter. *Ex parte Grassilli* (231 USPQ 393, 395).

Claim Rejections - 35 USC § 103

4. Claims 1, 5-8 and 11-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sonoda et al in view of Shimakura et al and Witte for the reasons of record and in view of the following comments.

5. Claims 22-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sonoda et al for the reasons of record and in view of the following comments.

6. Newly presented claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sonoda combined with Bjerrum et al (WO 98/09006).

7. Sonoda et al is interpreted and applied as in the pervious office action. As previously indicated, the Sonoda et al patent is directed to a process for forming a lubricative film for cold working on titanium and titanium alloy substrates. The substrates are immersed as the cathode in an electrolytic phosphate conversion coating bath which contains zinc cations and phosphate anions. An electric current is passed through the substrate to form a phosphate conversion coating. See the abstract. The bath contains zinc ions in a concentration of 1 to 50 g/l and phosphate ions in a concentration of 3 to 140 g/l. These ranges overlap the ranges recited in claim 25. The bath may also contain calcium, manganese or iron ions (column 2, lines 25-28). These ions correspond to the calcium ions and the divalent or trivalent

metal ions recited in claim 25. Sonoda et al teach that the bath may additionally contain an oxidizing agent such as nitric acid. See column 2, lines 18-34. Nitric acid is an auxiliary acid disclosed by applicant. The pH of the bath ranges from a highly acidic 1.0 to a moderately acidic 5.0 (column 2, lines 35-37). A bath with a highly acidic pH of 1 would be expected to correspond to the amount of auxiliary acid recited in claim 25. Coating is performed at a temperature ranging from 30° to 80° C (column 2, lines 39-41). Current density between 0.2 and 30 A/sq dm and electrolysis time between 10 seconds and 5 minutes may be used (column 2, lines 49-52). The coverage of the zinc phosphate film is between 2 and 20 g/sq m. Additionally, a lubricant is added on top of the phosphate film. Materials used as lubricants include known materials such as fatty acid sodium soap, oils and fats, mineral oils, solid lubricants, and the like (column 2, lines 56-62). In a preferred embodiment, the substrates are first treated with a colloidal titanium-based surface adjustment agent prior to immersion in the conversion coating bath. See column 2, lines 63-68.

8. Claim 25 recites that the metal substrate being treated is selected from the group consisting of ferrous materials, aluminum, magnesium and copper. This Markush group omits titanium from the group of metals disclosed at page 5, lines 22-26 of the specification. While the Sonoda et al patent is particularly directed to the treatment of titanium and titanium alloy substrates, it is the Examiner's

position that the teaching of the Sonoda et al patent extends to other metals. At column 1, lines 14-15 Sonoda et al notes that "In cold working of metal, use is generally made of a lubricant to impart lubricity, so as to prevent seizure", and at lines 22-23, "As with the cold working of steel, there are various ways of working titanium and titanium alloys". Thus, Sonoda et al recognizes that the concept of providing a lubricant coating on titanium prior to cold working is analogous to providing such a coating on steel. Sonoda et al indicate that the previously proposed methods of providing a lubricant coating on titanium and titanium alloys are not satisfactory, and propose an improved method. Sonoda et al explain the conventional phosphating process at column 3, lines 53-68. The reaction in an acidic zinc phosphate chemiforming processing solution includes the reactions shown by equations (1) and (2). Reaction (1) is an etching reaction in which metal is removed from the surface of the article and converted into metal ions along with the production of hydrogen. Sonoda et al state that in the case of titanium and titanium alloys, reaction (1) does not take place and, consequently, a phosphate film cannot be formed (column 4, lines 1-2). To overcome this problem, Sonoda et al propose the use of cathodic electrolysis to electrochemically produce hydrogen. See the equation at column 4, line 5. By using electrolysis, a zinc phosphate film can be formed on the surface of titanium or a titanium alloy even though it is not etched (column 3, lines 9-12). One of the advantages resulting from the use of electrolysis

to generate hydrogen recognized by Sonoda et al is that since no etching takes place, there is no eluted metal present in the conversion solution. Because of this, hardly any aging of the conversion coating solution takes place. See column 3, lines 34-39. This is the same advantage disclosed by applicant at page 9, lines 3-9 of the specification. The equation representing the cathodic electrolysis reaction shown by Sonoda et al is independent of the metal from which the workpiece is made. Thus, one of ordinary skill in the art would recognize that the process is applicable to workpieces made of metals other than titanium or titanium alloys.

9. The Bjerrum et al published application is directed to a method for electrochemical phosphating of metal surfaces, particularly stainless steel, to provide a phosphate base for a lubricant applied prior to cold forming. See the abstract. The aqueous phosphating solution may contain 0.5 to 100 g/l of zinc cations and 5 to 100 g/l of dissolved phosphate anions. These ranges significantly overlap the ranges recited by applicant. Nitrate ions may be present in an amount up to 100 g/l and the pH is between 0.5 and 5. The highly acidic pH of 0.5 and the amount of nitrate ions would be expected to be expected to correspond to the amount of auxiliary nitric acid recited in instant claim 25. The process is conducted electrolytically with a current density between 0.1 and 250 $mA.cm^2$. See page 2, lines 6-22. Bjerrum et al disclose that the addition of calcium to the phosphating solution results in improvements in the precipitation of the phosphate layer such as

greater density and reduced friction. See page 2, line 23 to page 3, line 5. The solution may contain 0.5 to 100 g/l calcium ions (page 2, line 14). Use of zinc ion and calcium ion concentrations from within the ranges disclosed by Bjerrum et al result in calcium to zinc ratios which overlap the ratio recited in instant claim 25.

10. The prior art of record is indicative of the level of skill of one of ordinary skill in the art. It would have been obvious at the time the invention was made to have applied the electrolytic phosphating process of Sonoda et al to metals other than titanium and titanium alloys because the Sonoda et al patent itself discloses chemical equations for the process which are not dependent on the workpiece metal, and because Bjerrum et al shows that an electrolytic phosphating process similar to that of Sonoda et al is applicable to metals broadly and to stainless steel in particular. Additionally, the use of a calcium to zinc ratio in the process of Sonoda et al that falls within the range recited by applicant would have been obvious because Bjerrum et al teach that the inclusion of calcium produces an improved phosphate deposit and suggest concentrations of calcium and zinc which produce the recited ratios.

Response to Amendment

11. Applicant's arguments have been carefully considered but are not deemed to be persuasive. With respect to the rejection under 35 U.S.C. 112, first paragraph,

applicant again urges that basis for the added negative limitation that the metal substrate is devoid of titanium and titanium alloys appears in the examples, none of which include titanium, and that the amendments to claims 1 and 22 merely serve to comport the claims with the working examples. This argument is not convincing. The examples begin at page 12 of the specification. Under the heading "Metal Substrates Used" applicant lists carbon steel (type S45C), austenitic stainless steel (type SUS 304), and aluminum (type A6061). The use of these three particular metals in the examples provides basis for claim limitations positively reciting any or all of these three metals. Such positive claim limitations are different in scope from the negative limitation added to claims 1 and 22. The examples illustrate three substrate metals that may be used, but are silent as to any metals which should not be included in the substrate. Consequently, they fail to provide basis for the negative limitation added to claims 1 and 22.

12. At page 12 of the Remarks, applicant argues that there is no incentive to combine the references used in the rejection. This argument is not persuasive. As indicated in the office action of January 2002, while the Sonoda et al patent teaches the inclusion of calcium in the zinc phosphate solution, the reference is silent as to the ratio between the zinc and calcium ions. Thus, the motivation to include calcium ions in the phosphating solution comes from the Sonoda et al patent itself. The Shimakura et al patent discloses the use of zinc phosphating solution which

contains both zinc and calcium ions in amounts where the ratio overlaps that recited in applicant's claims. The use of the calcium to zinc ratio shown by Shimakura et al in the process of Sonoda et al would have been obvious at the time the invention was made because Shimakura et al show that amounts of calcium and zinc ions producing the ratio recited by applicant result in the formation of an effective conversion coating. The motivation for using such a ratio is the demonstrated production of a desirable coating.

13. Applicant further argues that Sonoda '480 indicates a lack of transference to ferrous substrate of processes that are unique to titanium-based substrates. However, the passage of Sonoda et al quoted by applicant shows the lack of transference of the known process for steel substrates to titanium substrates, i.e., the opposite of what applicant states. In the passage cited by applicant, Sonoda et al indicates that the use of oil containing an extreme pressure agent or a soap or solid lubricant in addition to a phosphate are known useful processes for steel, but do not work in a satisfactory way for titanium. This suggests a lack of transference of the process used for steel to titanium. Contrary to applicant's contention, Sonoda et al do not indicate a lack of transference of the inventive process with titanium to other metals such as steel. As indicated in the discussion of Sonoda et al above with respect to newly presented claim 25, the equations for the electrolytic process of Sonoda et al are independent of the substrate metal used.

14. It is further noted that applicant's process preferably includes the step of applying a liquid containing colloidal titanium over the substrate. This raises the phosphate film production rate and produces finer crystals in the phosphate film. See page 6, lines 15-13. Thus, even if the substrate itself is devoid of titanium, the phosphate treatment is conducted on a layer of titanium particles. Sonoda et al also suggest the application of colloidal titanium, and teach that the colloidal titanium provides a large number of nuclei on which there is gradual growth (column 4, lines 28-33). Thus, the use of the Sonoda et al phosphating process on a substrate coated with a layer of colloidal titanium particles, such as that of applicant, is suggested.

15. Claims 2-4 and 9-10 have been canceled. Claim 5 is still written as depending on claim 4. Claim 10 is still written as depending on claim 10. Claims 5 and 10 have been interpreted as if they were dependent on claim 1. Claims 5 and 10 are objected to for improper dependency.

16. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to William T. Leader whose telephone number is 703-308-2530. The examiner can normally be reached on Mondays-Thursdays and alternate Fridays, 7:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King, can be reached on 703-308-1146. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

ROY KING
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700

William Leader
October 24, 2003